corrected, the purported gap between UNE-P rates and ILEC embedded costs largely disappears. *Id.*, Exhibit 1.

CCM makes an additional, independent error by including in its calculation the costs of dedicated lines and packet switching facilities that are *not* used by UNE-P customers. *Id.* ¶ 46. In other words, CCM compares the embedded cost of facilities used to provide a host of services (such as dedicated private line services, special access services, and Frame Relay) to the rates that the ILEC receives when providing facilities used to provide residential POTS. *Id.* Obviously, such a comparison cannot show whether UNE-P rates are compensatory.

High Tech Broadband Council ("HTBC"). Nor does the Haring and Rohlfs "white paper" offered on behalf of the HTBC reliably show that the ILECs must be freed from unbundling in order to deploy broadband networks. Haring and Rohlfs purport to model the economics of mass DSL deployment capable of supporting speeds up to 1.5 Mbps. HTBC, Haring-Rohlfs Report at 19. They describe two "scenarios" – one in which "killer" broadband applications do not develop and DSL prices remain "low" and one in which the applications are developed and the ILECs can charge much higher prices. *Id.* at 19-20. They conclude that, unless the probability of the high DSL price scenario is much greater than the low DSL price scenario, it will not be economic for ILECs to deploy broadly DSL. *Id.* at 20. And because unbundling keeps DSL-based services prices "low," Haring and Rohlfs conclude that these obligations must be eliminated to "incent" ILECs to deploy DSL technology.

This analysis does not even pass the red-face test. As described above, the ILECs have in fact already deployed DSL technology broadly. No weight can reasonably be given to a model that yields such patently counterfactual results. *See* Clarke-Donovan Dec. ¶ 53.

And even if these inconvenient facts could be ignored, Haring and Rohlfs' methodology is fundamentally flawed because, at the end of the day, they assume their conclusion. They assert, without any support, that a CLEC that purchases a "DSL UNE" will have costs well below the ILEC's cost of providing DSL, including the risk adjusted cost of capital. *Id.* ¶ 53. All this demonstrates is that if UNE rates do not reflect a relevant risk adjusted cost of capital, ILECs would not have incentive to invest in the underlying facilities. But that misses the relevant question, *i.e.*, whether ILEC investment incentives will be materially impaired so long as they are able to recover the full economic cost of the broadband facilities that they deploy, including a cost of capital that reflects the relevant risks of deploying those facilities. On this score, Haring and Rohlfs simply have nothing to offer.

IV. ADOPTION OF THE ILECS' PROPOSALS WOULD DISCOURAGE, AND IN MANY INSTANCES FORECLOSE, FURTHER FACILITY INVESTMENT BY CLECS, WOULD FURTHER ENTRENCH THE ILECS' MONOPOLIES, AND WOULD ELIMINATE VITAL PRO-CONSUMER BENEFITS.

AT&T's initial comments (at 40-64) provided an extensive explanation of the ways in which the availability of UNEs promotes CLEC's ability to invest in and deploy alternative facilities. AT&T provided both economic analysis and direct evidence of marketplace experience to show that UNEs have not discouraged CLEC investment in facilities. To the contrary, UNEs are necessary to enable such investment to take place. As AT&T showed, AT&T and other CLECs have strong incentives to invest in facilities in preference to UNEs when the economics are even close, and have done so. Indeed, given the recent devastation among facilities-based CLECs, many plainly invested to excess. Thus, if the Commission denied access to UNEs despite a finding of CLECs impairment, it clearly would not drive CLECs to invest in more facilities. In fact, the hard market evidence and economic experience of the past three years is that *no* firm will seek to compete against an incumbent monopolist where its ability

to do so will be impaired, because it could not attract the necessary capital. In sum, if access to UNEs is restricted, there will *not* be more facilities-based competition; rather, there will be less facilities-based and non-facilities-based competition alike.

This marketplace evidence can now be confirmed by hard empirical work. In his accompanying declaration, Dr. Clarke reports an empirical study as to whether AT&T's ability to lease UNEs from ILECs has sapped or enhanced its incentives to invest in its own local networks. Using three different specifications, Dr. Clarke demonstrates that "greater expenditure on, and/or use of, leased facilities is associated with greater deployment of owned facilities" by AT&T. Clarke Reply Dec. ¶¶10-12. Thus, restricting access to UNEs would *reduce* facilities deployment by AT&T and other CLECs.

The plans and experiences of other CLEC commenters are entirely consistent with AT&T's. As Eschelon explains, "the Commission can neither re-open the capital markets to CLECs nor transform Eschelon immediately into a profit-generating machine capable of funding facility investment internally." Reducing the availability of UNEs therefore "would not cause the Company to make additional investments in facilities to replace UNEs. Instead, Eschelon would attempt to respond by radically scaling back its business plan . . . ." Eschelon at 4, 10-15; *see also* GCI at 5-6, 30, 33-37 (GCI would not "still be able to provide ubiquitous competitive telephone service" without UNEs); Z-Tel at 78 ("Instead of opting to self-provision switching to serve mass market customers in restricted areas, it appears that CLECs are simply not providing as much mass market service in restricted states").

This record thus provides the detailed factual basis on which the Commission can "confront[]" the effects of unbundling on CLEC investment incentives in a more rigorous and comprehensive way than was possible from the record in the *UNE Remand* proceeding. *See*

USTA, 290 F.3d at 425. The current record is based on experience that was not available prior to the issuance of the *UNE Remand Order*. It establishes that if the Commission orders unbundling whenever and wherever the "impairment" standard is satisfied, CLECs will not be discouraged from investing in alternative facilities, and that there will be no "trade-off[]" of CLEC investment if such unbundling is required. *Id.*

The ILECs nonetheless continue to assert that making the current list of UNEs available at TELRIC rates discourages CLEC investment in facilities. But the Supreme Court examined that claim and rejected it for the most basic of reasons: it "founders on fact." *Verizon*, 122 S. Ct. at 1675. As the Court found, there has been "substantial resort to pure and partial facilities-based competition" in recent years, with CLEC facility investments "to the tune of $55 billion since the passage of the Act." *Id.* It "suffices to say that a regulatory scheme that can boast such substantial competitive capital spending over a 4-year period is not easily described as an unreasonable way to promote competitive investment in facilities." *Id.* at 1676.

The D.C. Circuit, to be sure, implicitly criticized the Supreme Court for this reasoning, adopting instead the view of the lone dissenting Justice on this point. Like the Supreme Court, the D.C. Circuit noted the Commission's argument "that both CLECs and ILECs have built facilities since passage of the 1996 . . . despite the Act's obviously having created a prospect of unbundling." *USTA*, 290 F.3d at 425. Unlike the Supreme Court, however, the D.C. Circuit found fault with that argument on the ground that "[t]he question is how such investment compares with what would have occurred in the absence of the prospect of unbundling, . . . an issue on which the record appears silent." *Id.*; *compare Verizon*, 122 S. Ct. at 1675 (finding unpersuasive the ILECs' "speculat[ion] that . . . investment has not been as much as it could have been" with less unbundling) (majority decision) *with id.* at 1694 (Breyer, J., dissenting) ("Nor do

we know whether this number [for investment] is small or large compared with what might have been").

But even if the Supreme Court's decision were not the authoritative one, the record here and the marketplace developments over the last three years provide a complete answer to the D.C. Circuit's "question." Under the existing unbundling regime, CLECs in fact *over*-invested, leading to massive bankruptcies, and even the firms that survived, have dramatically underutilized facilities.[87] Therefore, even if it were somehow shown (as it could not be) that CLECs would have invested even more under a more restrictive unbundling regime, those additional investments would have been exactly the sort the D.C. Circuit termed "wasteful," *USTA*, 290 F.3d at 427. Clearly, it would have been (and would now be) inconsistent with the Act and sound policy for the Commission to seek to encourage such investment. See *Verizon*, 122 S. Ct. at 1673 (recognizing "the competitive purpose of forcing efficient choices on all carriers whether incumbents or entrants").

The ILECs offer no marketplace evidence, let alone a sophisticated regression analysis to support their contrary assertions about unbundling and CLEC incentives. SBC and Verizon claim that a short article by a former FCC economist supports their argument, but the article does not do so. SBC at 7-8, Verizon at 4 (citing Eisner & Lehman, Fort Lewis College, *Regulatory Behavior and Competitive Entry*, for presentation at the 14th Annual Western Conference Center for Research in Regulated Industries, June 28, 2001). Although the article states that its findings

[87] *See* AT&T at 50-52 & Table 2 (detailing bankruptcies and other financial collapses of dozens of facilities-based CLECs); Willig Dec. ¶¶ 95-97 (explaining how collapse of CLEC industry was in large part due to overinvestment in facilities) *see also* BellSouth at 11-13 ("many CLECs overbuilt their networks . . . . [a] round of bankruptcies have ensued"); SBC at 4 ("While . . . facilities-based competition has thus advanced dramatically, there has been a shakeout in the marketplace, and a number of CLECs have failed").

"suggest that states with lower UNE prices have less facilities based entry," it also states that "contrary to expectations, *we find no evidence* that states with lower UNE prices have more non-facility entry. Instead, we have the puzzling result that in some specifications, states with lower UNE rates also have less CLEC entry." *Id.* at B4, B11 (emphasis added). Even if the finding that the authors understandably consider "puzzling" did not call their methodology into question – as it does – it makes clear that the study, even on its own terms, does not provide support for the proposition that the availability of UNEs leads CLECs to use UNEs *instead* of alternative facilities.[88]

The ILECs also claim that UNEs do not function as a bridge to facilities-based competition because CLECs allegedly do not in fact migrate customers served through UNE-P onto CLEC facilities. Qwest at 13 n.21; SBC at 6-7, 76; ILEC Report at I-9, II 17-18. Not only is this wrong, it is the wrong analogy. As AT&T's comments detailed, AT&T has already migrated a substantial number of business customers from UNE-P to UNE-L, and plans to migrate more.[89] *See* Brenner Dec. ¶¶ 50-51; *see also USTA*, 290 F.3d at 424 ("access to UNEs may enable a CLEC to enter the market gradually, building a customer base up to the level where its own investment would be profitable"). *Id.* ("the more widespread the availability of elements that can be more efficiently provided by the incumbent, . . the quicker competitors will set about

[88] In addition, this study uses the term "facilities-based entry," to mean entry that relies on *no* ILEC facilities. Therefore, unlike the Commission's use of the term, "facilities-based entry" in this study does not include, for example, entrants that combine unbundled loops with their own switches and other facilities. So even a State with substantial facilities-based entry (as the Commission uses the term) could be regarded in this study as a State with little or no facilities-based entry (as the study uses the term).

[89] On the residential side, AT&T's MSP offer – described in the Huels Declaration (¶¶ 64-72) today has begun to combine UNE-P with AT&T's own packet-switched network to provide local, long-distance, and high-speed data services to customers, and AT&T hopes eventually to be able to transfer those customers onto its circuit switches as well.

providing the other elements"). Other commenters likewise show that UNEs enabled a transition to facilities.[90] These represent the early stages of the UNE-to-facilities transition process; there will be growing numbers of such conversions as long as the Commission does not adopt the ILEC proposals here and abort the process.[91]

In fact, the ILEC's analogy here is the wrong one to begin with, because CLEC conversions of low volume customers served by voice-grade loops involve significantly higher costs for a CLEC than an ILEC for the simple reason that the ILECs' monopoly network is designed so that customers' loops all terminate at the ILECs' main distribution frame (and for IDLC loops directly at the ILEC's switch). In contrast, a CLEC seeking to use its own switch to serve such customers must bear the costs of (1) establishing and maintaining a collocation; (2) equipping the collocation; (3) purchasing distance-sensitive dedicated transport; (4) arranging for and successfully completing a hot cut; and (5) paying the ILEC's hot cut non-recurring charge – *all to replace the ILEC's cross-connect wire across the main distribution frame*. Thus, CLECs have "sensibly" invested in using their own switches to serve high-volume/high revenue customers served by DS-1 and higher level loops – just as economics would predict. *See Verizon*, 122 S. Ct. at 1668 n. 20.

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[90] *See, e.g.*, NewSouth at 7-13, 23-25 ("The revenue from UNEP has enabled NewSouth to make its facilities investment, and is vital in ensuring that NewSouth can continue to provide service to all of its customers"); GCI at 38 ("UNEs have allowed GCI to build a significant customer base first, allowing GCI to make its investment in loop plant now, after it has acquired a significant base of customers").

[91] It is notable that UNE-P was unavailable on a national basis until the Supreme Court reversed the Eighth Circuit and reinstated Commission Rule 315(b) in 1999. It is thus a function of the ILECs' own litigation strategy that the transition from UNEs to facilities is not even further along. Unsurprisingly, that process is most advanced in those areas – particularly New York – where the state made UNE-P available notwithstanding the Eighth Circuit's decision, and where CLECs have therefore had more time and a better opportunity to build up the necessary customer base through UNEs to make such a transition possible.

Moreover, the justification for UNEs does not lie solely in the facilities-based competition they will enable in the future – although that alone would be sufficient. It also lies in the consumer benefits UNEs are providing today. *See* Willig Reply Dec. ¶¶ 76-77 (explaining that as a matter of basic economics, UNE competition is a legitimate end in itself). As AT&T showed in its initial comments (at 88-91), AT&T is using UNE-P in New York and many other states to provide consumers with the benefits of serious price competition for the first time in history. Indeed, SBC-Ameritech has just announced – for the first time in recent history – that it will be reducing its local rates in Michigan, where UNE-P competition has now begun to take root.[92] UNE-P competition from AT&T and other CLECs likewise places competitive pressure on the ILECs to improve their retail operations and customer service.

WorldCom's recent announcement of its plans to use UNE-P to provide a combined unlimited local and long-distance offer in numerous states provides another example of the consumer benefits of UNE-P that the ILEC's proposals seek to eliminate.[93] Similarly, Z-Tel's comments (at 2-4; Curtis Aff. ¶¶ 4-7) describe the innovative software it has developed – through investments of over $100 million – to develop distinctive voicemail, call forwarding, and voice recognition capabilities that can be offered in conjunction with UNE-P. By contrast, if UNE-P were unavailable, AT&T and other CLECs would be unable to compete at all for most residential customers in most areas of the country.[94] Thus, a decision to eliminate any of the

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[92] *SBC Ameritech Cuts Local Telephone Call Rates for Michigan Consumers,* Detroit Free Press (June 12, 2002).

[93] *Comparing Plans for Phone Service*, Wall Street Journal, at D1 (July 2, 2002).

[94] *See, e.g.*, New York at 2 ("[I]t is premature to remove the UNEs that make up the UNE-Platform (UNE-P) because [CLECs] will be impaired in their ability to compete without the availability of UNE-P."); Indiana at 4 (UNE-P is "critical to the ability of many CLECs to compete against large ILECs"); Massachusetts at 4; Missouri at 7-8 ("To effectively compete, (continued . . .)

essential components of UNE-P would therefore have widespread harmful consumer consequences.

The Commission has in the past expressly recognized the benefits of intramodal competition using "shared" facilities when it ordered long distance carriers to permit other carriers to "resell" their services. *Resale Order*, 60 F.C.C.2d 261 (1976). In so holding, the Commission observed that resale permitted non-facilities-based carriers to compete with facilities-based carriers in "marketing, retailing, brokerage and related functions" and thereby promote "[p]ublic enjoyment of state-of-the-art communications technology and full utilization of existing capacity." *Id.* In particular, the Commission recognized that resale competition benefits the public because resellers have the ability to purchase "bulk discounted offerings" and then sell those services to several end users that would not individually qualify for the discounted offering. *Id.* ¶ 19; *see also id.*¶ 75. On the other hand, absent resale obligations, the Commission found that many carriers would not be able to compete because of the substantial costs of and regulatory obstacles to building national long distance networks. *Id.* ¶ 10. Thus, the

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competitors must be allowed to provide ubiquitously, substitutable telecommunications services to the customer base of the incumbent provider on a technology neutral basis," including a "combination of facilities and UNE-P"); ASCENT at 14-15 ("The UNE-Platform alone among the multiple entry vehicles designed by Congress is providing the sort of local residential competition that has consistently been contemplated, as well as bringing the benefits of local telephone competition to small business and outlying areas"); BTI at 6 ("UNE-P is the most successful method of rapidly introducing competition into the local exchange marketplace"); Eschelon Telecom, Morrisette Aff. ¶ 11 ("Without access to a UNE platform product, Eschelon would probably go out of business"); GCI at 49 ("all CLECs that seek to provide ubiquitous service to residential and business customers would be impaired without continued access to unbundled switching"); Navigator at 6 ("UNE-P provides the toehold necessary for a small company to begin to build a customer base and generate revenues necessary to provide a competitive alternative to residential customers"); New South at 21-24 ("UNEP thus enables NewSouth to provide service to smaller businesses and to utilize mass marketing sales (continued . . .)

Commission concluded this purely "synthetic" form of competition furthers the public interest by driving rates close to costs for all consumers, not simply those largest customers that had several facilities-based alternatives. *Id.* ¶ 76 ("[I]t has long been our policy that carriers should basically price according to service costs . . . . If a carrier recognizes that its communications services and facilities can be resold or shared, it will price according to costs.").

The ILECs' only response is a slogan: they deride UNE-P, and the benefits it provides, as something other than the "*real* competition" purportedly contemplated by the Act. SBC at iii (emphasis in original). The slogan is entirely hollow; indeed, the ILECs never actually explain what it means. If their claim is that carriers providing service through UNE-P do not use any of their own facilities to compete, it is false. Carriers providing service through UNE-P use their own "unshared" OS/DA, OSS, packet switches and related facilities, software, and marketing and other retailing resources, in combination with the ILECs' facilities – different in degree but not in kind from the mixture of ILEC and CLEC facilities used to provide service using unbundled loops. Indeed, because the Supreme Court held in *Iowa Utilities Board* "that the Commission's refusal to impose a facilities-ownership requirement was proper," *IUB*, 525 U.S. at 392-93, and because the Act expressly provides for entry not only through UNEs but also through resale, *see* 47 U.S.C. § 251(c)(4), there is no conceivable basis for claiming that non-facilities based competition is not envisioned as valuable by the Act. *See also Verizon*, 122 S. Ct. at 1664 ("We affirmed the Eighth Circuit . . . in upholding the FCC's broad definition of network elements to be provided and the FCC's understanding that the Act impose no facilities-ownership requirement."). Alternatively, if the ILECs' claim is that the competition is not "real"

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techniques," which "significantly expands the range of customers to whom the benefits of
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because it depends on TELRIC rates, which the ILECs oppose, their claim is completely foreclosed by *Verizon*'s holding that TELRIC reasonably implements the Act's ratemaking requirements and serves the Act's objectives, including the "eliminat[ion of] the monopolies enjoyed by the inheritors of AT&T's local franchises . . . [as] an end in itself." *Verizon*, 122 S. Ct. at 1654. Finally, it is beyond dispute that the benefits to consumers of this competition – price competition, non-price competition, and choice – are entirely "real."

The D.C. Circuit did not address this issue directly. It noted only that the *UNE Remand Order* had not "ma[d]e the argument" that "synthetic" competition would fulfill Congress' purpose. The Court therefore concluded that it did not need to address the claim that broad unbundling "would promote the goals of the Act by leading to rapid introduction of competition." *USTA*, 290 F.3d at 424. Whether or not UNE-P competition is "synthetic," the experience of the past three years – which was not available at the time of the *UNE Remand Order* – demonstrates that UNE-P competition provides consumer and other benefits that promote the Act's objectives, including the statutory objective "to give aspiring competitors every possible incentive to enter local retail telephone markets, short of confiscating the incumbents' property." *Verizon*, 122 S. Ct. at 1661. The ILECs have waged their campaign against UNE-P because consumers value the cost savings and the innovative services it enables, because UNE-P has been the principal entry vehicle in all the States in which competition has been most successful and the ILECs' market shares most threatened,[95] and because CLECs'

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competition can be made available").

[95] *See, e.g.*, New York at 2-4; Texas at 4; Georgia at 4-5; NARUC UNE-P Resolution (adopted Nov. 14, 2001) (attached to letter from Joan Smith *et al.* to Chairman Powell and Commissioners Abernathy, Copps, and Martin, CC Docket No. 96-98 (December 5, 2001)).

abilities both to serve residential and small business locations and to develop into facilities-based carriers depend upon its continued availability. Thus, rather than encourage more short-term facilities construction, eliminating UNE-P would eliminate all these real consumer benefits and leave consumers captive to the ILECs' continuing monopolies.

V. THE STATE COMMISSIONS OVERWHELMINGLY SUPPORT RETENTION, AND INDEED, EXPANSION, OF THE CURRENT UNE LIST.

The state commission commenters *overwhelmingly* agree that the Commission should retain – and, if anything, expand – its current unbundling requirements. As explained below, the state commissions agree that the availability of unbundled elements remains critical to the development of local competition, and that, specifically, the Commission should not eliminate or dilute any of its existing requirements with respect to broadband-related network elements, the switching element, or transmission elements. And the states strongly urge the Commission to reaffirm their statutory right to adopt additional unbundling obligations pursuant to section 251(d)(3).

The fact that the state commissions overwhelmingly support the current list is especially significant in light of their expertise and familiarity with competitive conditions. The focus of this proceeding – whether CLECs would be "impaired" without access to unbundled network elements – is fundamentally a *factual* inquiry. The state commissions are far more familiar with those facts than this Commission. Indeed, the state commissions are heavily involved in the day-to-day implementation of this Commission's unbundling requirements, through their work in implementing interconnection agreements, reviewing BOC section 271 applications, and supporting consumers' interests in competition generally. State commissions routinely conduct extensive evidentiary proceedings, using discovery, live testimony and cross-examination, to develop and resolve the many specific factual issues that are relevant to any impairment analysis.

See Notice ¶ 75 ("[w]e also recognize that state commissions may be more familiar than the Commission with the characteristics of markets and incumbent carriers within their jurisdictions"). Accordingly, the states' views should carry special weight in this proceeding.

The state commissions uniformly recognize that the CLEC industry is in a precarious position, and that any changes in the availability of unbundled network elements could have a devastating impact on the further development of competition. For example, California explains (at 5) that "CLECs are in a much weaker position than they were two years ago, and there is no indication that this situation will reverse itself anytime soon. The remaining CLECs competing today have less ready access to capital, and cannot afford to take the risks they may have found acceptable a short time ago." Thus, as California notes (*id.*), "[t]o remain viable, many CLECs must take advantage of facilities that are already in the ground, but in order to do so, they need access to a complete offering of UNEs that is financially attractive and available without impediments imposed by the ILEC." Indeed, "[w]ithout proper recognition of the actual state of competition, an FCC order could harm rather than promote competition if based on *assumptions* that the competitive market is progressive and healthy. . . . given current market conditions, it may be appropriate to require *more, not less*, unbundling." *Id.* (emphasis added).[96]

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[96] *See also* Illinois at 3 ("removing UNEs from the list and revising unbundling rules at this point would undermine the competitive progress the ICC has achieved to date and frustrate the continuing efforts to foster a competitive local exchange market in Illinois"); Kansas at 3-4 (since SBC has been granted section 271 authority, "competition in Kansas has been slow to develop, particularly for rural customers," and "[o]ne important tool the KCC has available in promoting competition is its ability to establish access obligations under [section 251(d)(3)]"); Indiana at 4 ("[b]y assuming that ILECs are not threatened by CLECs and need to be relieved of their obligations toward CLECs, the FCC proposed policies will likely lead to even greater market share of ILECs, further financial hardship for the CLECs, . . . [which] would have serious anticompetitive effects in many Indiana markets and would reduce the already low level of competition that ILECs generally face in Indiana"); Missouri at 7 ("competition has not met the market opening expectations of the Act. Competition must not only exist, but should impose

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Similarly, the state commissions broadly agree that the availability of unbundled network elements does not deter facilities-based entry. As Pennsylvania explains, "the continuation of a national list of required UNEs is still necessary to *further* facilities-based competition," because "permitting carriers to acquire sufficient customers and essential market information [is necessary to] enable them to determine whether construction of new facilities is justified." Penn. at 5 (emphasis added). Indeed, as Massachusetts notes (at 6) "[a]s long as the economic foundation of the pricing of UNEs accurately reflects forward-looking costs and risks" – and as the Supreme Court has now held, it does – "unbundling should not provide a disincentive to competition or to investment."

The state commenters make clear that this is equally true for deployment of broadband facilities. As Indiana correctly notes (at 9), "many recent reports have indicated that any lag in making broadband and advanced services available on a widespread basis is due to a lack of demand and high prices, rather than to restrictions in supply." California draws on its own experience and states (at 8), "[t]he fact that Pacific/SBC has successfully promoted DSL service to customers under the current regulatory environment to the point of outstripping cable modem service makes clear that the current regulatory environment is conducive to, and does not impede investment in, broadband technology by the ILEC." Indeed, California adequately sums up a view shared by many: "Investment in new construction is not an end in itself if competition is reduced and customer choice is limited." California at 10; *see also id.* at 8-9 ("[i]nvestment must not come at the expense of reduced competition from competing carriers, and thus fewer options from which consumers may choose among carriers and services"); Illinois at 4-5 ("[a] statement

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credible pricing constraints and, of course, be sustainable," and "therefore . . . it is premature to
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reflecting the FCC's intent to enforce Section 251(c)(3) to the fullest extent of the law, will encourage rather than discourage ILECs from employing advanced services.. . . . In acting to further enable competitors to deploy advanced services facilities, the FCC will ensure that the market, rather than the ILECs, will dictate deployment of advanced services").

Consistent with these principles, the state commissions support retention of the existing unbundling requirements with respect to individual UNEs. For example, many state commenters urge the Commission not to de-list any broadband-related UNEs. As New York states (at 6), "[i]t is premature for the Commission to eliminate the unbundling requirements of the ILECs' bottleneck facilities (*i.e.*, the local loop/subloop) used in the provision of wireline broadband services, regardless of whether the technology being deployed is copper or fiber." California notes (at 9) that "while investment and competition in providing backbone-based Internet services have soared, little if any competition has occurred in the local loop – the 'last mile' necessary for an end-user customer to access the Internet." "In short, alternative technologies to an ILEC's broadband services are not ubiquitously available," and "[b]ecause the ILEC remains the dominant provider of these services, it is premature to reduce the unbundling obligations imposed upon it." California at 12. Indeed, as New York demonstrates (at 6), if the Commission de-lists broadband UNEs – and assuming the Commission could "withstand the legal challenges" – "only the ILECs will be able to offer wireline-based broadband."[97]

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eliminate the unbundling requirements established pursuant to the *UNE Remand Order*").

[97] *See also* New York at 7 ("it is prohibitively expensive and burdensome for CLECs to provision DSL capabilities without access to Verizon's remote terminals and the ability to line-split. A CLEC's ability to obtain these elements on a reasonable, commercial basis is not practicable. Without these elements, a CLEC's ability to compete in the broadband market will be impaired").

On that score, the state commissions uniformly reject reliance on "intermodal" competition alone to spur broadband competition. For example, the Texas commission bluntly "question[s] whether there exists, at this time, sufficient intermodal competition to benefit customers." Texas at 5. As Texas notes (at 5-6), "the outlook for competition from the fixed wireless sector has dimmed considerably," and "competition from the satellite industry is in its fledgling stages and represents less than one percent of the current residential broadband service market." *See also* California at 12 ("[w]ireless technologies used to support broadband service are not widely deployed in California"). And New York observes (at 6) that "[w]hile the wireline ILECs are competing for broadband with cable offerings, CLECs – both old and new – continue to seek access to end-user customers for broadband using the ILECs' infrastructure over the last mile," and "[c]onsequently, it is premature to relieve the ILECs of the current obligations to offer wholesale access to all capabilities of the local loop for broadband purposes." *See also* California at 12 ("one third of all Californians live in cities where DSL service is the only choice for broadband service"). Finally, as Indiana concludes (at 9), "effective competition can only be achieved in the foreseeable future through use of ILEC facilities that must be made available to competitors (through the so-called 'intramodal competition')." *See also* California at 8 ("[a]s the dominant provider of broadband services in California, unbundling requirements applicable to Pacific/SBC must therefore remain in place if significant competition is to become a reality, and its benefits brought to California customers").[98]

The state commissions also strongly support retention of the switching element, and access to the UNE-Platform. New York, which recently adopted an order strongly reaffirming

[98] California even urges the Commission to "re-examine the elements required for unbundled packet switching in light of how the industry has evolved since their adoption." California at 20. "Packet switching unbundling is imperative if broadband competition is to emerge." *Id.*

the broad availability of UNE-P, states flatly that "it is premature to remove the UNEs that make up the UNE-Platform (UNE-P) because [CLECs] will be impaired in their ability to compete without the availability of UNE-P." New York at 2. As New York correctly explains, "[a]lthough competition in New York is developing, it is premature to eliminate the UNE-P requirement until CLECs can migrate large volumes of customers to their own switches more efficiently. . . . Until hot cuts can be performed in much greater volumes, CLECs' lack of access to the UNE-P will materially diminish their ability to provide local service." *Id.* at 3-4 (explaining that Verizon would have to achieve a 4400 percent improvement in its hot cut performance to accommodate the volumes of customers that are currently choosing UNE-P). Indeed, as California recognizes, the ability to provide both voice and data services over UNE-P is critical to the future development of competition. *See* California at 20 ("California urges the Commission to retain [unbundled switching] in order to enable non-facilities-based CLECs to have access to the UNE-Platform to self-provision or partner with a data carrier to provide voice and data services on the same line (line splitting)"). Other state commissions echo these concerns. *See* Texas at 4 ("in Texas, CLECs have tended to rely heavily on the UNE Platform as an entry strategy," and as a result CLECs have a substantially higher market share in Texas than elsewhere); Georgia at 4-5 ("[w]hile many competitors initially attempted to enter the market by deploying switches and purchasing loop and transport elements from the incumbents, the past two years has seen an increase in entry via the UNE-P strategy, through which competitive carriers are able to offer ubiquitous service to the residential and small business market, without the substantial upfront investment required for switch-based entry," and UNE-P, with 240,000 lines in service, now "outpaces the number of lines served through switch-based entry or through

resale"); Indiana at 4 (UNE-P is "critical to the ability of many CLECs to compete against large ILECs").

State commissions similarly agree that the Commission should retain the requirement that ILECs provide access to unbundled transmission elements. As to loops, "there is no doubt that the local loop is an essential facility that the CLECs cannot economically self-provision or obtain from third parties. Replacement of the local loop is prohibitively expensive and raises major land use problems. While wireless and cable alternatives are promising, they are not sufficiently available to constitute a substitute for the local loop." New York at 4; *see also* California at 17 ("no significant [loop] competition exists for the vast majority of the ILEC's local customers," and that unbundling is necessary because "California is unaware of any alternative, less burdensome options available to achieve the goals of the Act"). Moreover, "high-capacity" loops should remain available as UNEs. As New York notes (at 5), "Verizon continues to be the dominant provider of high-capacity loops used to provide service to large volume customers," and that "[e]ven in lower/midtown Manhattan, Verizon facilities (retail and wholesale) still serve over half of all special service circuits." *See also id.* ("[i]n fact, in upstate New York, Verizon facilities serve almost 90% of such circuits"); California at 19 (retaining the unbundling requirement for DS-1 loops "is crucial because CLECs purchase DS-1 loops solely from the ILEC," "there is no alternative supplier," and "if the DS-1 unbundling requirement is lifted, this fast growing, lucrative, and economically important market will fall totally into the lap of the ILEC"). California also observes (at 21) that the availability of unbundled transport is "the reason there is competition from CLECs," and that "[r]emoving the requirement that transport be unbundled at cost-based rates will only reduce the amount of competition for broadband services."

The State commissions also affirm that the availability of loop-transport combinations is critically important. "EEL competition should be welcomed and encouraged." California at 11 n.6. Indeed, California correctly notes that "protection [of ILEC access service revenues] is inconsistent with the FCC's approach to access charge reform, which has been to rely on the market to drive access prices toward cost." *See also* Indiana at 4 (EELs are "critical to the ability of many CLECs to compete against large ILECs"). And as Illinois recognizes (at 5), "the prohibition on commingling UNEs with tariffed services" is having a "negative impact" and "significantly reduce[s] the feasibility of UNE based entry." As Illinois correctly notes (*id.*), the commingling restriction means that "CLECs employing the ILECs' networks are often forced to establish separate facilities for these different traffic types [i.e., access and local traffic], thereby increasing their cost of provision above that of the ILEC."

Finally, the state commissions unanimously urge the Commission not to pre-empt state efforts to adopt additional unbundling requirements, above the Commission's national, minimum list. For example, New York "urges the Commission to continue to correctly implement § 251(d)(3) of the Act, which permits states, if they choose, to add to the minimum list of national UNEs and adopt policies that reflect local market conditions that are consistent with the Act." NYDPS at 8. Texas states (at 2) that it "believes the states remain in the best position to recognize the characteristics of markets and incumbent carriers within Texas, and the entry strategies that have worked best," and therefore "it is imperative that states retain the authority to impose additional unbundling obligations on ILECs." Georgia concurs, stating (at 5) that it is "currently considering . . . the extent to which local switching, a critical component of the UNE-P offering, should remain an unbundled element throughout the Georgia market," and "we urge the FCC [not to pre-judge that decision] by adopting pre-emptive federal rules that would negate

a state commission's ability to determine, given the factual circumstances within its jurisdiction, that UNEs which remain critical to the development of sustainable competition are subject to unbundling requirements." Such a policy would simply "effectuate[] the cooperative federalism that underlies the 1996 Act." California at 24.[99]

In short, the Commission should not lightly dismiss the essentially unanimous views of the states that competitive entry remains precarious and that the availability of the current national list of UNEs is critical to the continued development of competition. The state commissions have a perspective and a familiarity with actual, on-the-ground competitive conditions that the Commission simply cannot replicate in this notice-and-comment rulemaking proceeding. The states' overwhelming support for the current national UNE list is powerful grounds for retaining the current list in full.

VI. CLEC IMPAIRMENTS RELATING TO ALL-COPPER, DLC-EQUIPPED, AND "HIGH-CAPACITY" FIBER LOOPS AFFECT ALL CUSTOMER GROUPS SERVED BY SUCH FACILITIES AND SHOULD REMAIN AVAILABLE AS UNBUNDLED ELEMENTS ON A NATIONWIDE BASIS.

The record overwhelmingly establishes that CLECs would be impaired without access to unbundled loops. Loops are the quintessential natural monopoly element in the ILEC network. They enjoy both enormous economies of scale, but also are characterized by substantial fixed costs. Thus, self-deployment of loops requires an entrant to invest in wholly duplicative facilities that cannot be used for any other purpose if the investment fails. Further, CLECs that seek to self-deploy loops must be reasonably assured of sufficient revenues to recover their sunk costs. Together, these factors mean that a CLEC can self-deploy loops only when it has comparable levels of traffic as the ILEC (and therefore scale economies comparable to the ILEC)

[99] *See also* Pennsylvania at 5-6; Oklahoma at 4-6; Florida at 2, 5-6; Indiana at 5, 10; Illinois at 3; Massachusetts at 3; Michigan at 3-4; Kansas at 3-4.

and when it has been able to sign up the served customer in advance to a long-term agreement so that it has a reasonable assurance that it will recover its sunk investment.

But as shown below, these conditions are never met for in the case of customer locations where service demand is low enough that only voice-grade (*i.e.*, generally copper-based) loops are required to serve the demand. And even with regard to "high-capacity" loops, the cases where it is economic for CLECs to build such loops are quite limited. That is because, as explained above, it is only feasible for a CLEC to build a loop when it is assured that it will have a customer in place that will generate revenues sufficient to recover the entire loop investment. That means that the CLEC must generally get the customer to agree to take service pursuant to a long term contract and *then* build the loop. But CLECs are frequently unable to secure the necessary rights of way from municipalities and building owners necessary to build loops in a reasonable period of time and customers are simply unwilling to order service and then wait months for it to be provisioned. Indeed, in many instances CLECs are unable to secure the necessary rights of way or building access altogether, making it impossible for them to self-deploy a loop.

This economic evidence of impairment is confirmed by, not refuted, by the ILEC Report. The ILECs make the remarkable claim that competitive LECs have deployed between 11 or 19 million of "their own loop facilities" (Verizon at 114; SBC at 99), and that CLECs "are using alternative last-mile facilities to serve the vast majority of their large business customers" (SBC at 99). The ILECs can reach this conclusion only by using a Rube Goldberg methodology that treats *CLEC purchase of special access as the CLECs' self-deployment of their own loops.* Thus, once this patent flaw is corrected, the number of self-deployed loops calculated by the ILECs' approach drops to the minimal level reflected in the Commission's own data and the comments.

A. There Is No Serious Dispute That CLECs Would Be Impaired Without Access To Unbundled Copper and DLC-Equipped Loops Because Of Cost Disparities Linked To Natural Monopoly Characteristics Of The Incumbents' Networks.

There can be no serious dispute that the incumbents' ubiquitous loop plant is characterized by enormous economies of scale and scope and constitutes a natural monopoly. Indeed, because the ILECs were historically granted monopoly franchises, the ILECs designed and deployed their loop architecture for use by a single carrier – themselves. Accordingly, this Commission, the D.C. Circuit, and the Supreme Court have consistently recognized that loops in general and especially voice-grade loops (*i.e.*, loops using copper or copper combined with DLC electronics) are the quintessential bottleneck element. *See, e.g., UNE Remand Order* ¶¶ 182-83. Without access to unbundled loops, CLECs would face prohibitive practical and cost disadvantages that are linked directly to the natural monopoly characteristics of the incumbents' networks. Indeed, CLECs could not hope to duplicate these facilities anywhere in the country. *See USTA*, 290 F.3d at 422-23. And critically, these conditions hold for *all* copper-based loops, whether they use copper conductor in whole or only in part.[100] Accordingly, the Commission should require ILECs to provide unbundled access to all such loops on a nationwide basis.

As the Supreme Court recently recognized, "[i]t is easy to see why a company that owns a local exchange . . . would have an almost insurmountable advantage not only routing calls within the exchange, but in terminal equipment and long-distance calling as well." *Verizon*, 122 S. Ct. at 1662. The Court explained that this is because "[a] newcomer *could not compete* with

[100] Copper-based loops include all loops that use copper distribution facilities that terminate at a customer's premises. This includes all-copper loops and all DLC-enhanced loops (including NGDLC-enhanced loops), regardless of the type of feeder plant used in the facility, and regardless of the capacity of the service provided over the facilities. A fuller description of the sissues relating to NGDLC loops is provided in Part VII, *infra*.

the incumbent carrier to provide local service without coming close to replicating the incumbent's entire existing network, the most costly and difficult part of which would be laying down the 'last mile' of feeder wire, the local loop, to the thousands (or millions) of terminal points in individual houses and businesses." *Id.* (emphasis added). The Supreme Court further endorsed the FCC's prior conclusion that new entrants need to share ILEC "facilities that are very expensive to duplicate (say, loop elements)." *Id.* at 1672 n.27. And the D.C. Circuit expressly reiterated this very same point, acknowledging that "the Supreme Court in *Verizon* observed that 'entrants may need to share some facilities that are very expensive to duplicate (say, loop elements),'" which would thus be subject to unbundling under any impairment standard. *See USTA v. FCC*, 290 F.3d at 426; *USTA v. FCC*, Nos. 00-1012 *et al.*, Petition for Rehearing and Rehearing *En Banc* (FCC), at 12 (D.C. Cir., filed July 8, 2002) (loop is "widely agreed to have natural monopoly characteristics").

These judicial decisions simply recognize the undeniable reality that the incumbents' fixed investment in ubiquitous loop connections is so massive, and confers such enormous unit cost advantages, that it forecloses any possibility that a CLEC could duplicate them. For decades, the ILECs have been protected by State franchising laws and local zoning rules, and over that time they have deployed approximately 220 million local loops, all funded by captive ratepayers. *Universal Service Monitoring Report*, Tables 10.1 & 10.2 (October 2001). In fact, "[a]ccording to the Commission's own ARMIS reports, ILECs have deployed nearly six million kilometers of local loop copper cable" and "own more than 19 million telephone poles, over which is strung two million kilometers of aerial cabling" as well as "nearly two million kilometers worth of underground cabling in trenches and conduit." Covad at 48. In sum, the "total reported book value of ILEC telecommunications cable and wire facilities alone (not

including other ILEC assets) in 2000 was over $349 billion." *Id.* The notion that any individual CLEC (or CLECs collectively) could practically or economically replicate these transmission facilities – whether to serve a neighborhood, a home, or a business – simply defies reality.

As shown below, CLECs simply cannot replicate loops to serve customer locations where service demand is low enough that only voice-grade (*i.e.*, generally copper-based loops) are required to serve the demand. This means that CLECs cannot reach the vast majority of customer locations without access to these ILEC facilities as unbundled network elements. In all such cases, the ILECs' efficient loop architecture results in massive economies of scale and scope that no CLEC could possibly duplicate. And as explained below, the ILECs' references to the theoretical possibility of "intermodal" loop competition from cable and CMRS providers provides no grounds for de-listing low-volume loops anywhere in the country.

1. Most of the Cost of Loop Deployment is in the Structures and Rights of Way, not in the Copper or Fiber Conductor.

The ILECs have designed their networks very efficiently to achieve enormous economies of scale in their outside loop plant. Indeed, because the ILECs were historically protected monopolies that could be assured of serving the entire market in a particular locality, the ILECs purposely designed their networks to minimize the costs for, and to serve the needs of, a single provider. To understand the extent to which CLECs would be "impaired" without unbundled loops, it is useful to begin with a brief description of the ILECs' efficient outside plant design, and why it leads to huge economies of scale and scope over the entire market demand.

Efficient outside plant design is driven by a central fact: most of the cost of deploying loops is in the supporting structures, placement, rights of way, and access to buildings, and not in the conductor (fiber strand or copper wires) themselves. *See infra* Part VI.A.2. Indeed, as Covad notes (at 28), "[d]eploying a single loop requires much more than the mere purchase of a

piece of copper: it requires incredible fixed costs of trenching, stringing wire underground and along poles, purchasing rights of way for such activities, and similar expenses." Constructing this supporting infrastructure is extremely costly and labor intensive and must be done along the loop's entire route. The costs of the actual conductor – whether it be copper or fiber – represents only a small portion of the overall deployment cost. *See* Fea-Giovannucci Reply Dec. ¶ 7.

Because the cost of loop deployment is concentrated in the supporting infrastructure, the ILECs have designed their networks to minimize the extent to which they must modify that infrastructure when they add customers or new services. The ILECs have accomplished this by establishing separate "feeder" and "distribution" facilities. The ILECs deploy large capacity feeder facilities between their central office and an intermediate aggregation point outside the central office where a cross-connection device is located (and perhaps transmission equipment as well). From that cross-connection point, outside plant engineers then connect surrounding customer premises by running a separate but cross-connected distribution cable to the individual customer locations. In non-technical terms, the ILEC builds a very "fat" pipe out from the central office into a neighborhood, which can carry the traffic of many customers, and from there it builds progressively shorter, "thinner" pipes to reach each location it serves. Fea-Giovannucci Reply Dec. ¶ 8.

Equally important, the ILECs designed and deployed their outside loop plant so that the individual facility segments – *e.g.*, the feeder, distribution, and customer drops – have capacity to serve demand well in excess of the demand reasonably expected over the life of the facility. For example, a customer drop may contain six pairs of wires rather than two, because the carrying costs of the extra capacity are small compared to the cost deploying additional capacity later (*e.g.*, to add a second or third line). Similarly, fiber feeder may be deployed with a substantial

number of unused (dark) strands. The purpose and advantage of such an arrangement is that the ILEC minimizes the risk that it will have to deploy a new transmission facility which, like the one currently in service, has enormous fixed costs. Then, to the maximum extent possible, the ILEC accommodates new customers or new services simply by making incremental modifications to existing loop plant. *See* Fea-Giovannucci Reply Dec. ¶¶ 8-9.[101]

This efficient loop plant design means that the ILECs' loops are characterized by enormous economies of scale that enable the ILECs to spread the high fixed costs of constructing loop infrastructure across hundreds if not thousands of loops. *See* Fea-Giovannucci Reply Dec. ¶ 7. And as noted above, the ILECs were able to deploy this efficient loop plant design only because they were protected monopolists, and as such they could be assured of serving 100 percent of the demand in any given area. Moreover, it assured that their investments could be recouped from captive ratepayers through regulated rates and a guaranteed rate of return. *See id.* ¶¶ 6-7.

This understates the incumbents' advantages, however, because other features of the ILECs' loop architecture increase their efficiencies and scale economies. Because the ILEC monopolies could be assured of serving the entire market, the incumbent could also employ facility homing and pair-gain strategies in their outside plant, which allowed the ILECs to optimize the unit costs of their loop plant against the unit costs of local switching. In other

[101] For example, the ILEC typically adds a new home to its network simply by bridge tapping a previously utilized (but not currently utilized) distribution pair. It is also possible to add transmission electronics at the feeder-distribution interface and extend service to entirely new neighborhoods. This is accomplished by multiplexing the feeder and thereby effectively gaining "new" pairs where none previously existed and then adding new distribution cables and serving area interfaces. The built-in flexibility of such arrangements is also important to minimize maintenance costs. If the original feeder (or distribution) pair is defective, the ILEC can eliminate the defective wires by pair cross-connecting the to a different ones that are free from defects. This forestalls the need to rehabilitate or replace either the feeder or distribution cable.

words, because the ILEC served all customers in a particular territory, it could further increase the efficiency of its network by deploying transmission functionality in its outside plant (*i.e.*, digital loop carrier ("DLC") electronics and, in many cases, fiber feeder plant as well).[102] Deployment of DLC and fiber feeder plant allowed the ILECs to locate their switches so that the increased costs of extending customer loops beyond the traditional range of copper was offset (or more than offset) by the economies of scale achieved through larger switches.

The efficient deployment of DLC decreases the number of physical feeder facilities required to connect central offices to customer premises and thereby reduces the cost of the connectivity between these two points. DLC equipment allows the ILEC to multiplex signals received over the distribution facilities and place multiple signals onto a single conductor in the ILEC feeder plant. Because this technology was frequently used to obviate the need to deploy a larger feeder facility, its implementation was often called a "pair-gain" strategy. In other words, the multiplexing function, which allows many distribution pairs to be placed on fewer feeder pairs, effectively frees up previously utilized pairs and creates what is referred to as a pair "gain" compared to previously available pairs at that point. This result served to increase the life of the ILECs' existing feeder facilities if additional demand materialized. The same result is equally applicable to fiber feeder, because higher capacity multiplexing equipment can effectively "create" new capacity on fiber feeder facilities where none existed before. Because of the large number of currently captive customers that the ILECs home to aggregation points in the ILEC outside plant network, only the ILECs' loop plant design can attain such economies of scale, efficiencies of operation, and flexibility to accommodate new demand.

[102] The impairment presented by traditional DLC is compounded through the deployment of *next generation* DLC ("NGDLC"), which is discussed in Part VII below.

ILECs also derive other advantages from DLC arrangements – specifically, the ability to deploy a wide variety of line cards at the remote terminal, which permits ILECs to provide many different types of loops over their existing facilities with a simple change of plug-in electronics at the remote trrminal. Indeed, the ILECs' networks today can typically provide loops up to at least the DS-1 level over their existing copper distribution facilities and much of its all-copper loop plant. Because of the planned use of relatively short copper distribution facilities, when the appropriate plug-in electronics are placed in the remote terminal, copper pairs can support DS-1 level services and may only require a single distribution pair (as occurs with HDSL-2 technology). For longer copper loops (as may occur where both the feeder and distribution facilities are copper), the ILEC can still support DS-1 loops although it may involve the use of two pairs of wires rather than a single pair.[103]

Placing DLC transmission electronics in the loop plant and extending fiber to the remote terminals where the equipment is housed not only increases the ILECs' economies of scale but it also improves the incumbents' economies of scope. *See infra* Part VI.A.2. Traditional DLC, through the replacement of plug-in line cards and channel bank units, can be immediately transformed into what the incumbents have referred to as "next generation" DLC (or NGDLC) and the changes can occur without disruption to other operating services.[104] While the

[103] In the past, copper based DS-1 loops were provided using two copper pairs and may have required intermediate signal regenerators to overcome transmission losses in the copper. More recently, advances in DSL technology obviated the need for signal regeneration but still relied upon the use of two pairs (*i.e.*, HDSL-4). Further improvements have allowed the same transmission rates to occur using a single pair (HDSL-2). For these reasons, DS-1 loops are commonly copper-based. Thus, if CLECs are impaired in serving customers using copper-based loops for voice-grade services, they are equally (and possibly more) impaired when providing service that "justifies" as a DS-1 loop.

[104] For example, Alcatel product material describes its Litespan® 2000 system as "an advanced OC-3 SONET-based next generation digital loop carrier (NGDLC) *providing both ATM-based* (continued . . .)

incumbents seek to give the impression that NGDLC is something innovative or "advanced," it is actually neither because it merely permits parallel use of asychronous transmission mode ("ATM")-based and time division multiplexing ("TDM")-based transmissions. However, because only the incumbents can economically place this transmission technology in close proximity to retail customers and use it in conjunction with their existing loop plant, only the incumbents have such flexibility in offering loops of virtually any bandwidth,[105] an advantage no CLEC could possibly attain.

The ILECs' efficient loop design with respect to DLC-equipped loops also leads to substantial advantages in service quality. Where the ILECs' DLC-equipped loops aggregate the demand from many customers onto fiber, the ILECs will typically take steps to ensure that any failure of its feeder facilities does not negatively impact a large amount of customers. This is accomplished by diversely routing a back-up fiber between the point of aggregation and the central office, generally through use of a ring architecture. The ILECs can accomplish this easily given their ubiquitous loop infrastructure and widely deployed fiber feeder.[106] This effectively

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(. . . continued)
xDSL and TDM-based narrowband/wideband services from the same plug-in channel unit slots" and that "ATM [is] supported with no additional fiber overlay, no need for WDM." http://www7.alcatel.com/telecom/lsp2000.jhtml (07/09/02) (emphasis added). And the upgrade to ATM-based transport can even occur without customer disruptions: "While in service, any Litespan channel bank can be upgraded from a TDM-only system to support a 600 Mbps ATM fabric, using the ATM bank control unit." Litespan ADSL, Integrated POTS and ADSL, p. 2 (available at http://www.alcatel.com/datasheets/lsp_adsl.pdf).

[105] In fact the Alcatel website notes that the Litespan 2000 unit can support optical level loops provided that a high density fiber bank is deployed. *See* Litespan, Multiservice Access Platform, page 5 (available at http://www7.alcatel.com/datasheets/lsp_pb.pdf;jsessionid=LCFV5DZZFPQCYCTFR0GU1CYKMWHI23GC).

[106] For example, the 2001 ARMIS data (FCC Report 43-07 Infrastructure Report) show that Verizon (Bell Atlantic) has over 50% of its working channels of fiber based DLC while (continued . . .)

doubles the a CLEC's impairment if it is attempting to duplicate both the ILECs' original and redundant loop paths from scratch.

Finally, these costs are sunk. An investment is sunk if, once made, it cannot be re-deployed for some other use. *See UNE Remand Order* ¶ 75. Investments spent on trenching, structure, and rights of way for a loop clearly fall into this category. Sunk costs make entry very risky because, if forced to exit, the entrant loses that investment altogether. For that reason, no rational carrier will deploy a loop unless it is knows in advance that it will have a customer that will generate sufficient revenues to allow it to recover its sunk loop investment. *See* Willig Reply Dec. ¶¶ 21-22, 26, 39.

These facts clearly demonstrate why the Supreme Court correctly found that the ILECs' efficient outside plant design gives them "almost insurmountable" advantages over any CLEC with respect to loop functionality. *Verizon*, 122 S. Ct. at 1662. For any customer premises a CLEC is considering serving – even in "new" areas – in virtually all cases the ILEC has already deployed loop facilities close to that location that not only have a high degree of adaptability, but also generally have available capacity. Accordingly, only the incumbent has the unique advantage of spreading the enormous fixed costs of this critical infrastructure over the broadest customer base and generating per-unit costs far lower than any new entrant could hope to achieve, regardless of the level of demand it could generate. Even if the ILEC must incur some costs for the "new" area, it is only the relatively modest cost of extending plant or introducing

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(. . . continued)
BellSouth has over 36%, with SBC (without SNET) and Qwest each having about 14% of working channels on fiber based DLC (comparing row #390 to row #370).

pair-gain equipment, not the enormous cost of entirely new end-to-end construction.[107] Under those circumstances, CLECs simply cannot economically deploy loops, and they certainly are unable to deploy copper-based loops under any circumstances.

2. ILECs Enormous Cost Advantages with Respect to Copper-Based Loops are Directly Linked to Natural Monopoly Characteristics of their Networks.

As can be seen from the foregoing, ILECs' loop facilities have – properly – been built to achieve enormous economies of scale and scope. Moreover, if competitive loop plant cannot be operated as efficiently as the ILEC's, it represents true sunk costs, because these facilities cannot be moved elsewhere. Thus, CLECs face debilitating cost disadvantages and real entry barriers in any attempt to duplicate these facilities. *See* Clarke Dec. ¶¶ 29-38; Willig Reply Dec. ¶¶ 32-39.

In AT&T's initial comments, Dr. Clarke analyzed the cost disadvantages that any CLEC deploying loops would face given the economies of scale and scope inherent in the ILECs' networks.[108] With respect to all-copper loops, he explained that "[b]y far the largest fraction of costs associated with [deployment of] loops are their [up-front] structure and cable costs." *See* Clarke Dec. ¶ 23. As Dr. Clarke explained:

> While loop structure cost increases as customers are located further from the wire center, it is insensitive to the number of these customers. This is because a minimum sized telephone pole or cable trench can accommodate large capacity cables as easily as it can accommodate small capacity cables. Thus, once a cable route is established, there are only very small incremental structure costs to serving additional customer lines located along the route.

Id.; *see also id.* ¶ 21 (describing the characteristics of copper loop deployment).

[107] And even if the feeder needs expansion, the ILEC can typically do so by adding electronics to the facility, rather than constructing new plant.

[108] It should be noted that Dr. Clarke's analysis is limited to quantifying differences in economies of scale and scope, and does not address other real-world barriers to entry, such as extra costs associated with obtaining rights of way or building access. *See id.* ¶ 5 & n.1.

Furthermore, Dr. Clarke's analysis shows that these characteristics are equally true for DLC-equipped loops. *See* Clarke Dec. ¶ 23 ("[e]ven when fiber/copper technology is used, this same characteristic holds"). As Dr. Clarke explained, "[a]lthough there are modest incremental costs associated with the line cards at the DLC remote terminal that scale with demand, an equally substantial portion of the cost of these remote terminals is fixed." *Id.* Moreover, "because fiber cable costs scale even less with demand than do copper cable costs, the overall effect is to see similar economies of scale and density in the provision of fiber/copper loops as with all-copper loops." *Id.*

Because loop deployment is characterized by extremely high fixed costs, Dr. Clarke's analysis shows that a CLEC would face huge per-unit cost disparities if it attempted to deploy its own loops. Dr. Clarke used the HAI 5.1 Model and the Commission's Synthesis Model to model a new entrant's costs against Southwestern Bell-Missouri.[109] Both of these models contain a method for determining whether the efficient loop configuration in any particular situation is all-copper loops or a hybrid of fiber feeder and copper distribution facilities.[110]

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[109] As Dr. Clarke explained, "[t]hese analyses are presented only for SWB-MO because it is time-consuming to run multiple model scenarios for the entire country. This is especially true in the case of the Synthesis Model because of the disaggregated nature of its customer location data files. SWB-MO was selected as a sample state because its geography, density and cost structures are very similar to national averages. It is unlikely that the results would be materially different if they were reported on a national basis." *See* Clarke Dec. ¶ 30 n.5.

[110] As Dr. Clarke explains, the HAI model "engineers fiber or copper feeder cables to extend from existing wire center locations into each neighborhood based on specific routings." Clarke Dec. ¶ 26. The Synthesis Model "engineers loop plant using a database containing a road surrogate location for every customer. It then clusters these customer locations into serving areas or 'neighborhoods,' and engineers fiber or copper feeder cables to extend from existing wire center locations fairly directly into each neighborhood." *Id.* ¶ 27.

Using the HAI model, Dr. Clarke found that "if one assumes that an entrant secures an aggressive 30% market share in each cluster served by SWB-MO, the entrant's loop investments per line will exceed those of the incumbent by 70%." Clarke Dec. ¶ 30 & Charts 1 & 2. The results are similar if the CLEC attempts to target its entry to certain clusters. As Dr. Clarke found, "[i]f a CLEC targets 30% of the incumbent's clusters, and wins a 30% market share in each, . . . its loop investment and monthly cost disadvantages will be 87% and 65% relative to the incumbent." Clarke Dec. ¶ 33 & Charts 5 & 6.[111] Application of the Synthesis Model produces substantially similar results. As Dr. Clarke found (¶ 36), "if an entrant gains a 30% share of all customer locations, it faces loop investments that exceed the incumbent's by 45% per line, and loop monthly costs that are 39% higher than the incumbent's." And as Dr. Clarke notes, these costs disparities are especially significant because loop costs constitute a large proportion of the overall cost of providing telephone service.[112]

Accordingly, both all-copper and DLC-equipped loops are unquestionably characterized by huge natural monopoly-like economies of scale and scope over the entire extent of the market, and as both the Supreme Court and D.C. Circuit recognized, facilities-based CLECs would therefore face "almost insurmountable" cost disparities in competing with the incumbent that alone constitute "impairment" within the meaning of section 251(d)(2). *See Verizon,* 122 S. Ct.

[111] The CLEC's cost disadvantage disappears in any given cluster only when the CLEC gains a 100 percent market share in that cluster. *See* Clarke Dec. ¶ 31 ("in this polar case, the CLEC's loop cost disadvantage practically disappears (because in engineering loop plant, there are very few costs that are shared between clusters)").

[112] *See* Clarke Dec. ¶ 30 n.7 ("[a]lthough modeled percentage loop cost disadvantages may appear to be similar to, or less than switching cost disadvantages, this may not be really the case. Because a customer's loop is usually three to four times more costly than his switching, a given percentage loop cost disadvantage is of far greater economic significance than an equal percentage switching cost disadvantage.").

at 1662; *USTA*, 290 F.3d at 426; *see also* Willig Dec. ¶¶ 67-68; Willig Reply Dec. ¶¶ 37-39. Moreover, loop investments, once made, represent sunk costs, transforming the ILECs' huge economies of scale and scope into true entry barriers. *See* Willig Reply Dec. ¶ 22.

Unsurprisingly, the commenters overwhelmingly agree that CLECs cannot expect to duplicate the enormous economies of scale of the ILECs' local transmission facilities. *See, e.g.*, New York at 4 ("there is no doubt that the local loop is an essential facility that the CLECs cannot economically self-provision or obtain from third parties"); California at 17 ("no significant [loop] competition exists for the vast majority of the ILEC's local customers," and that unbundling is necessary because "California is unaware of any alternative, less burdensome options available to achieve the goals of the Act"); WorldCom at 4 ("there are very significant economies of scale in the loop plant"); UNE Platform Coalition at 24 ("CLECs will most likely never be able to approximate the ubiquity of ILEC plant and the economies of scale and scope that factor into the ILECs' cost structure, and this fact is well established"); Covad at 9-10 ("[i]t has never been, nor will it ever be, either economically or technically feasible for any company to replicate the nationwide loop and transport architecture built up by the monopoly incumbent telephone companies over the last century"). As Eschelon aptly summarizes:

> the ILEC can construct local outside plant far more economically than Eschelon because of its ability to build incrementally rather than deploy all at once; because it can aggregate traffic; because it builds to serve all customers in an area rather than a subset; because it enjoys volume discounts with contractors and for materials; and because it has been in the network construction business for decades and has the internal resources and engineering records to build efficiently.

Eschelon, Paul Hanser Aff. at 4.

This analysis also applies to investment in so-called "greenfield" loops – *e.g.*, new loops that ILECs build today in new residential areas. In virtually every case, the ILEC has already

built extensive loop facilities near these new residences. As a result, the ILEC has already incurred much of the cost of building the infrastructure necessary to support those "new" loops, and it has already spread those costs over hundreds (or thousands) of its other existing loops. Therefore, an ILEC's "greenfield" build would take advantage of the massive economies of scale and scope inherent in its existing, efficient loop design, while a CLEC would continue to experience severe cost disparities in any attempt to deploy its own competing loops. Indeed, any such CLEC investment would clearly be economically "wasteful." *See USTA*, 290 F.3d at 426; Fea-Giovannucci Reply Dec. ¶ 8.

This analysis also demonstrates that there is no material difference in the impairment for copper-based loops, whether they are used to provide voice-grade services loops over analog technology or digital loop interfaces at or below the DS-1 level (including xDSL type interfaces). As shown above, the ILECs generally provide DS-1 loops over all-copper and copper/fiber facilities. Thus, the loop architecture for DS-1 loops is essentially identical to the architecture of the traditional voice-grade/analog POTS loop. Even in a DLC-equipped architecture, the only difference between a traditional POTS loop and a DS-1 loop is the number of copper distribution pairs required and the type of plug-in line card inserted in the DLC frame. Accordingly, the scale economies and cost disparities that any CLEC would face in attempting to replicate such loops are the same as they would be for any customer location served by either voice-grade loops. Moreover, as explained in more detail below, a CLEC cannot economically deploy a loop unless it can be assured that serve enormous demand over that loop – *i.e.*, no less than multiple DS-3s – and provide service for a sufficiently extended period to permit recovery of all of its costs. Otherwise the customer location represents a level of demand that is too small – and thus a per-unit cost that is too large – for a CLEC to economically deploy its own loop facilities in

competition with the ILEC's monopoly advantages. *See* California at 19 (retaining the unbundling requirement for DS-1 loops "is crucial because CLECs purchase DS-1 loops solely from the ILEC," "there is no alternative supplier," and "if the DS-1 unbundling requirement is lifted, this fast growing, lucrative, and economically important market will fall totally into the lap of the ILEC").

These findings are particularly significant, because copper-based technology is the most economically efficient means of deploying loops in the vast majority of situations. AT&T at 131-32. Indeed, as AT&T showed (at 132 n.99), over 98 percent of ILEC loop plant today is copper, either in whole or in part.[113] Thus, it is obvious that these impairments are national in scope and that it would be economically irrational for a new entrant to install new copper-based facilities anywhere to compete with the incumbents' ubiquitous loop plant.

3. The Possibility of "Intermodal" Loop Competition has no Impact on CLECs' Impairment.

The ILECs do not argue that CLECs could replicate the ILECs' ubiquitous network of copper and copper/fiber loops, or even that CLECs could economically deploy copper loops in some circumstances. Rather, the ILECs halfheartedly claim that the Commission could de-list "POTS loops" on the basis of "intermodal" competition from cable and wireless providers. *See* Verizon at 122-28; SBC at 102-03; BellSouth at 64-65. These forms of intermodal competition are in their infancy, however, and do not offer any viable alternative to the ILECs' local loops. As a result, any de-listing of unbundled loops would be wholly premature.

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[113] Table 10.2 of the *Universal Service Monitoring Report* shows that there are 217.4 million loop plant copper pairs terminated in the former RBOC and GTE offices while there are only 2.9 million fiber strands. Even assuming that these are all fiber loops (when in fact this figure includes copper loops connected to DLC), a conservative estimate of the proportion of fiber loops is less than 2% (2.9 million/221.5 million = 1.3%) of all loops.

Cable telephony, for example, is not a mature form of competition. As Professor Willig notes, "[t]o date, cable entrants nationwide are serving only less than 1% of the local market." *Id.* (citing *Local Telephone Competition*, Table 5 (Feb. 2002)). Cable offerings are also limited to residential areas, and provide no alternative for business customers. De-listing unbundled loops on this basis would therefore represent an enormous step *backwards* for competition, as the Commission would in effect be shutting down viable "intramodal" competitors in exchange for a single competitor with tiny market share. Indeed, as Professor Willig notes (Willig Dec. ¶ 86), "CLECs are today serving almost as many local residential telephone customers through UNE-P in New York State alone than are served by all cable operators in the entire country."[114]

Moreover, CLECs would continue to be impaired without access to unbundled loops because cable telephony providers have no legal obligation to unbundle their networks (*see* 47 U.S.C. § 251(c), (h)), and there is no evidence that they offer any alternative supply to requesting telecommunications carriers. Therefore, that supply is not relevant to whether CLECs are impaired without access to unbundled loops. *See IUB*, 525 U.S. at 392.

Similarly, it is evident that new entrants also cannot match the cable companies' ability to deploy their loop functionality. Indeed, cable companies' potential to offer telephone service has arisen only because their cable networks, which were built to provide cable television services, (1) were proven in economically on the basis of a separate revenue stream from a completely different service (program distribution); (2) were initially constructed, like the ILECs' networks, as franchised monopolies; and (3) exhibit scale economies and other monopoly-derived advantages similar to those of the ILECs. CLECs could no more replicate the cable companies'

[114] Even the *Broadband 2001 Report*, on which the ILECs erroneously rely elsewhere, states that cable telephony will continue to have only single digit penetration by 2005.

networks, and match the cable companies' scale economies, than they could hope to replicate the ILECs' networks.

Congress did not regard cable telephony as sufficient, by itself, to warrant de-listing of loops. Indeed, as the Joint Explanatory Statement makes clear, Congress expected cable companies to enter the local market immediately after passage of the 1996 Act:

> [M]eaningful facilities-based competition is possible, given that cable services are available to more than 95 percent of United States homes. Some of the initial forays of cable companies into local telephony therefore hold the promise of providing the sort of local residential competition that has consistently been contemplated. For example, large, well established companies such as Time Warner and Jones Intercable are actively pursuing plans to offer local telephone service in significant markets. Similarly, Cablevision has recently entered into an interconnection agreement with New York Telephone with the goal of offering telephony on Long Island to its 650,000 cable subscribers.

See Joint Explanatory Statement at 148. But despite that expectation (and the concomitant requirement that ILECs make interconnection available to facilities-based carriers), Congress required ILECs to make network elements available on an unbundled basis. Indeed, the Joint Explanatory Statement expressly identifies local loops as an unbundled network element. Joint Explanatory Statement at 116; *see also UNE Remand Order* ¶ 55 (Congress was not content to create a duopoly).[115]

Similarly, the market data clearly demonstrate that wireless phones remain a complement to traditional local wireline telephony, not a substitute for it. The Commission has previously recognized that wireless services do not offer the same functionality or service quality as wireline services, and the data capabilities of wireless services are decidedly inferior to wireline. *See UNE Remand Order* ¶ 188. Indeed, the ILEC Report asserts that only "3 percent of wireless

[115] As Professor Willig also noted, cable "competition holds substantial promise, but even if it proves effective, the result will only be one alternative to the ILEC, not the multiple broad-based providers that is the object of the Act." Willig Dec. ¶ 87.

subscribers" – which is itself a subset of all telephone users – have "abandoned wireline in favor of wireless entirely." ILEC Report at IV-13. Other sources relied upon by the ILEC Report are more revealing with respect to primary line replacement, showing that by 2005-06 the cumulative impact of primary line replacement by wireless will be only reach about 2-3 million lines (a tiny percentage of the total demand).[116] In short, these forms of competition are far from mature, and retaining the requirement that incumbents provide unbundled loops is the only means of assuring a "significant enhancement of competition." *USTA*, 290 F.3d at 429; *see also* New York at 4 ("[w]hile wireless and cable alternatives are promising, they are not sufficiently available to constitute a substitute for the local loop").

4. CLECs Cannot Serve *Any* Low Volume Customer Locations With Self-Provided Loops.

For all of these reasons, virtually all commenters agree that there is no viable business case that supports a CLEC building a transmission facility between the premises of a residential or small business location and the CLEC's network – whether to its switch or to a collocation. *See, e.g.*, New York at 4 ("there is no doubt that the local loop is an essential facility that the CLECs cannot economically self-provision or obtain from third parties"); California at 17 ("no significant [loop] competition exists for the vast majority of the ILEC's local customers," and unbundling is necessary because "California is unaware of any alternative, less burdensome options available to achieve the goals of the Act"); WorldCom at 33 ("[a] viable business model

[116] For example, the Forrester Research Report, *Sizing US Consumer Telecom* (January 2002), at 9, estimates that only 2.3 million primary lines will be disconnected and replaced by wireless over the period 2001 to 2006. Similarly, the IDC *Wireless Displacement of Wireline Forecast and Analysis*, 2001-2005, projects 1.2 million primary lines displaced by 2.5G and 3G Wireless (Figure 21, page 27) and about another 1.5 million from 1G and 2G wireless technology (compare Figure 14, page 22 and Figure 10, page 18), for a total of 2.7 million lines. In fact, the same figures from the IDC report show no primary line displacement in 2001 by 2.5G and 3G technology and in the range of 1 million primary line displaced by 1G and 2G.

simply does not exist at this time for the construction of facilities to provide local voice service to residential and small business customers"); Allegiance at 24 ("[i]n no case is the ILECs' market power over the provision of inputs greater than in the case of voice-grade loops"); Covad at 16 ("[t]he CLECs that chose to build out their own loops, albeit in limited geographic areas, have incurred the greatest expense, obtained the least coverage or otherwise proved the least successful"); UNE Platform Coalition at 41 ("self-provisioning of loop plant, while theoretically possible, is, in most cases uneconomic").

Not only does the incumbents' loop plant exhibit scale and scope economies that make CLEC duplication prohibitively expensive to serve low volume customer locations, they are also characterized by other barriers to entry that are also directly "linked" to the incumbents' historical monopoly. *See USTA*, 290 F.3d at 427. Most pertinently, as Professor Willig explained (Willig Dec. ¶ 62), "ILECs received rights of way from local governments for underground cables and telephone poles and wires with only minimal transaction costs, for persons in the neighborhood or municipality otherwise would not receive *any* telecommunications services." CLECs, in contrast, "often incur substantial transactional costs – in some cases, discriminatory higher charges – and delays in getting rights of way, as local governments balance any negative impacts of new rights of way applications (such as in the form of disruption of traffic) with the benefits not of initial telecommunications service, but of simply additional competition." *Id.* ¶ 63; *see also* Fea-Giovannucci Dec. ¶¶ 30-37. These first mover advantages are "classic entry barriers – that is, they are costs that the ILECs as first movers never had to bear." Willig Dec. ¶ 63. And CLECs face other severe disadvantages that stem from the incumbent's position as the historical monopolist, such as preferential zoning rights, the right to

exercise governmental rights of eminent domain, favorable franchising fees, and preferences in obtaining permits to construct or dig. *See* Fea-Giovannucci Reply Dec. ¶¶ 9, 31-32, 39 & n.18.

Indeed, because it is not economically feasible to replicate copper-based facilities, AT&T self-provisions *no* copper loops to *any* of its customers for either local or long distance services. Lesher-Frontera Dec. ¶ 43. AT&T, like all other competitors other than cable providers, thus remains entirely dependent upon ILECs to provide last-mile loop facilities to low volume customer locations. Given the incumbents' natural monopoly advantages of scale, scope and density, as well as a century of government and captive ratepayer support, there is no legitimate dispute that all CLECs would be impaired without access to incumbent loop facilities when they seek to offer services that are most efficiently provisioned using copper-based technology, anywhere in the country.

In sum, the impairments described above are severe entry barriers that are the direct result of the natural monopoly characteristics of the ILECs' networks, they represent sunk costs, and they apply across the entire range of demand. *See USTA*, 290 F.3d at 426-27. Accordingly, all copper and copper/fiber loops – which includes DS-1 loops – should remain available as unbundled network elements on a nationwide basis.

B. The Same Entry Barriers – And More – Apply To "High-Capacity" Loops.

CLEC impairments with regard to "high-capacity" fiber loops also apply nationwide. As with all-copper and copper/fiber hybrid loops, the most substantial costs in deploying high capacity fiber loops are the structures upon or within which the conductor resides, not in the actual cost of the conductor itself. Unlike copper and copper/fiber hybrid loops that are deployed to virtually every customer premises, fiber loops are only justified to the relatively few locations that have the greatest aggregation of telecommunications demand. And unlike copper distribution, which can be bridge tapped to provide connectivity to a particular location at

minimal cost, fiber can only be used to connect the particular locations to which it extends.[117] Because the ILECs already have extensive interoffice transport networks with in most metropolitan areas and because they have deployed extensive fiber connectivity to remote terminals, generally in a ring architecture, prudent pre-planning of its fiber deployment positions them to extend their existing fiber to additional customer locations much more easily than the CLECs. In fact, commonly deployed DLC infrastructure can readily adapt to deliver fiber loops.

Moreover, even in those limited cases where self-deployment could be theoretically justified given the specific conditions for a particular building, CLECs often face critical entry barriers that preclude deployment in all but a handful of cases. These barriers include: (1) the inability to construct new facilities as promptly or cost-effectively as the incumbents; (2) customers' unwillingness to wait the additional time necessary for CLECs to construct such facilities; and (3) landlords' refusal to allow CLECs to terminate facilities within the building in a manner that permits the CLEC to serve other customers in the same building at a later date. All of these factors, in turn, have combined to make genuine "build" opportunities few and far between, and even then the "severe capital crisis [that is] putting a tremendous strain on the telecommunications industry"[118] has made access to the capital CLECs need to construct such loops difficult or impossible to obtain at reasonable costs.

Thus, the record clearly demonstrates that without unbundled access to all loops, including high capacity loops, CLECs would be "impaired" under any reading of section

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[117] This is of particular importance to CLECs, because even in the relatively few cases that they have been able to deploy their own high-capacity loops, landlords typically do not allow them to serve an entire building. AT&T at 133-34, 140-48.

[118] *See* FCC New Release, *FCC Chairman Michael Powell Appointed to President Bush's Corporate Fraud Task Force* (July 9, 2002).

251(d)(2). These facts also demonstrate why, as shown below, the ILECs' extravagant claims that CLECs have deployed "millions" of high-capacity loops are simply false.

1. CLECs Seeking to Deploy Fiber Loops Face Severe Cost and Practical Disparities because they Lack the Economies of Scale and Scope that are Linked to the Incumbents' Monopolies.

For purposes of the impairment analysis, there is no fundamental economic or engineering difference between copper-based loops and "high-capacity" fiber loops. As with copper-based loops, most of the cost of deploying fiber loops is not in the fiber conductor itself, but in the enormous fixed costs of the supporting infrastructure – the trenching, conduits, rights of way, and building access. "High-capacity" fiber loops are therefore characterized by the same severe economies of scale and scope as copper loops, and exhibit the same natural monopoly characteristics. Moreover, as with all loops, they represent obviously sunk costs that cannot be recouped if the CLEC is unsuccessful. *See* Willig Reply Dec. ¶¶ 20, 32-39. Accordingly, except in extremely limited and unusual circumstances that cannot be predicted in advance, any CLEC attempting to build its own fiber loops faces severe entry barriers that are directly linked to the natural monopoly characteristics of the incumbents' networks. *See USTA*, 290 F.3d at 427.

As with their copper-based loop plant, the ILECs' efficient outside plant design for deploying fiber loops gives them enormous economies of scale and scope, as well as substantial first mover advantages. Like all loops, fiber loops connect two points – *i.e.*, the central office and the customer's premises. For the entire route between those two points, the ILEC must invest in the enormous fixed costs to construct the infrastructure necessary to support the fiber loop, including the trenching, cable conduits, rights of way, and building access. And just as with copper-based loops, ILECs have achieved enormous economies by constructing fiber facilities, including substantial dark fiber capacity, to points at or near most customer locations, including the customer premises with the highest potential to require fiber loops.

This was made possible because of the ILECs' extensive use of fiber in their networks to connect their local serving offices, as well as their increasing use of fiber in their transport networks to connect local serving offices to remote terminals. Because interoffice fiber facilities and the local loop fiber feeder generally share the same structures (and possibly the same cable), and because the fiber cable is typically deployed with substantial excess capacity, those already-deployed facilities stand available for use as part of an ILEC fiber loop. The ILEC can thus combine these available strands, effectively building a ring with strategically placed access points that permit subsequent extension of that ring to specific customer buildings. As with copper-based loops, this fiber architecture also allows the ILECs to spread the enormous fixed costs of deployment for the largest portion of the loop – the feeder portion – over thousands of loops and many buildings and customers while at the same time substantially shortening the time required to connect a building to its fiber. *See* Fea-Giovannucci Reply Dec. ¶ 7.

CLECs cannot match these economies. A CLEC does not have an existing network of rights of way, conduit and fiber conductors deployed to establish ubiquitous connections to all local serving offices and all customer locations in an area, and as a result it cannot deploy facilities to every large building in a flexible and incremental manner. Moreover, if a CLEC deploys a loop and it does not win any business in that building, then the loop facility would be stranded and could not be redeployed. Therefore, the most that a CLEC can do is to build fiber rings in hopes of being close enough to extend individual loops (or "laterals") to buildings. These laterals can only be established from pre-engineered access points on the fiber ring and are not generally provided with back-up facilities. Thus, the extension must be short, to minimize the risk of an unprotected facility segment cut. But even if the fiber ring passes in front of a

building the CLEC seeks to serve, there is no assurance that the pre-engineered access point for the fiber is anywhere close to it. *See* Fea-Giovannucci Reply Dec. ¶¶ 18-20.

Thus, even though the CLEC's fiber may pass through a conduit in close proximity to a building, the access point for splicign in the lateral may be hundreds if not thousands of feet away. In sharp contrast, the ILECs are the only carriers that have extensively deployed fiber rings with widely scattered access points, and thus they are the only carriers that can readily establish fiber extensions to serve customers with fiber-based loops. This advantage stems directly from their heritage as protected monopolists, which allowed them to deploy a large amount of fiber to their remote terminals in a ring architecture.[119]

ILECs can thus achieve an extremely low per-unit cost for fiber loops that no CLEC could hope to match. A CLEC that wishes to deploy a fiber loop must construct the loop, including all supporting infrastructure, usually from a collocation in the central office to the customer's premises. As with copper-based loops, however, before it can deploy such loops, the CLEC must obtain the capital to build the same fixed infrastructure that the ILEC has already largely built and whose cost has been averaged over many hundred or thousands of loops. As a result, a CLEC can rarely identify conditions that permit it economically deploy a high-capacity loop. Given there are only several tens of thousands of buildings in the entire country that have a level of demand that would potentially support a CLEC-deployed loop and all other impairments identified must be absent, the probability that any one CLEC would be in a position to successfully deploy its own loops are exceedingly small. Indeed, AT&T has only about 6000

[119] As noted earlier, the Acatel 2000 DC – the voice loop work horse – can readily be upgraded to a fiber distribution interface wqith a 600 Mbps backhaul capability. Thus, even for DS-3 and above loops, the ILECs' monopoly advantage comes into play even without consideration of their preferential ability to use existing structures, dark fiber and rights of way.

buildings "on-net." *See* AT&T Lesher-Frontera Dec. ¶ 41. By contrast, the ILECs' ARMIS reports to the Commission in 2001 showed that they have delivered 3 million fiber customer services (at the DS-0, DS-1 and DS-3 level) terminated at customer locations.[120]

The comments confirm that CLECs' ability to deploy fiber loops is extremely limited. For example, WorldCom explains that "CLECs' ability to extend their networks to new buildings is limited by the very high fixed and sunk costs of constructing a network extension." WorldCom's sworn testimony explains that "the cost of recent WorldCom 'building adds' has averaged about $250,000 per building," and because those up-front "construction costs are so high, only a small percentage of business customer buildings generate sufficient revenues to justify the investment needed to add them to a CLEC's [pre-existing] ring." WorldCom at 19 & Fleming Dec. ¶¶ 5-10. For these reasons, "[a] building is usually not even considered for a 'building add' unless projected WorldCom customer demand in that building is greater than a DS-3"[121] – and even for buildings that meet that threshold, "only a limited number ultimately 'prove in' as justifying the costs of being added to WorldCom's network." WorldCom at 19 & Fleming Dec. ¶ 10; *see also* ALTS at 58-59. And critically, the Supreme Court has recognized that if these problems apply to the largest carriers such as AT&T and WorldCom, their impact on smaller potential competitors is substantially magnified. *See Verizon*, 122 S. Ct. at 1668.

The CLECs' impairment is actually even *greater*, however, because other features of the ILECs' existing loop architecture magnify the ILECs' already-built-in cost advantages. In particular, the ILECs have an enormous head start on the CLECs in terms of fiber loop deployment. As the ILECs' ARMIS data demonstrate, the ILECs have been deploying fiber in

[120] *See* ARMIS Report 43-07, sum of rows 481 through 483.

[121] A DS-3 is equivalent to 672 DS-0s.

their networks since 1991, whether for interoffice transport, digital loop carrier or service to individual customer premises.[122] This fact means that ILECs will generally have a huge timing advantage over any CLEC that attempts to provide service over self-deployed loops, and that advantage is often dispositive. As with copper-based plant, ILECs build their fiber loops with substantial excess capacity, because it is much cheaper to deploy such excess capacity during initial construction than to add it later. Indeed, the cost of deploying additional fiber-based capacity is minimal compared to monetary and time costs of new construction.[123] Where dark fiber exists, adding "new" capacity requires only that optical terminating equipment be placed at each end of the facility. And even where no dark fiber exists, it is generally feasible to upgrade the existing terminal electronics to significantly increase the ILEC's capacity (for example, from an OC-3 to an OC-12 or OC-48). Because the ILEC typically has *already* deployed excess fiber capacity, it can match any service the CLEC wishes to provide by performing comparatively inexpensive upgrades to the electronics associated with its existing facilities. *See* Fea-Giovannucci Reply Dec. ¶¶ 7-9.

A CLEC, on the other hand, faces a completely different situation. It generally cannot rely on existing facilities, rights of way, or conduit. Rather, it must start from scratch to construct the loop, which will inevitably take many months of pre-construction while the CLEC negotiates and secures (if possible) the necessary rights of way and construction permits from the municipality and negotiates terms from of building access from the landlord.[124] As AT&T has

[122] *See* ARMIS 43-07 Infrastructure Report database rows, 0363, 0440 and 0480 through 484.

[123] The Commission's Synthesis model shows that the average incremental cost of a fiber strand is about $0.02 to $0.03 per foot.

[124] A CLEC must complete all of these actions even if it is fortunate enough to be able to connect a building to a pre-existing access point in an existing building ring.

previously shown, customers typically do not wish to wait until the CLEC can build the necessary facilities, and they usually choose the ILEC instead. *See* Fea-Taggart Use Restriction Dec. ¶¶ 17, 18, 20; *see also* WorldCom at 20 ("the ILECs, with their ubiquitous networks, usually have facilities already in place, [but] CLECs typically need between six and nine months to construct a network spur to a new building"); Eschelon, Hanser Aff. at 4 ("[n]ot knowing where our customer locations are until the sale, Eschelon could not build out local loop to customer locations within the short time period that customers are willing to wait for service").

And, of course, for all the reasons described above, given the ILECs' huge economies of scale and scope, even if a CLEC could overcome such problems, its costs to construct a fiber facility are typically much greater than the ILECs'. Moreover, as described in Part VI.B.2 immediately below, the typical limitations on CLEC building access restrict the CLEC's ability to use such loops, creating significant unit cost disadvantages compared to the ILECs, who face no such limitations.

Nor can CLECs get around these problems by constructing loops first and seeking business afterward. To the contrary, loops are dedicated to a single location (and often a single customer). Thus, they are not only represent a sunk cost but they also create a debilitating "chicken and egg" dilemma for any CLEC – *i.e.*, in most cases the competitive carrier simply cannot know whether it will have sufficient traffic to justify the large up-front costs of deploying fiber loops to a particular building (or customer).[125] Moreover, as Eschelon states (at 20), "[i]nvestment in loop plant for Eschelon is extremely risky because there is no opportunity for

[125] *See, e.g.*, Allegiance at 7 ("geographic market for loops and transport . . . is (as the Commission has recognized) limited to point-to-point routes"); Covad at 84 ("[t]ransmission facilities, such as loops and interoffice transport, cannot be geographically removed from the customers and central offices they connect").

Eschelon to wholesale its plant." If a CLEC that builds in anticipation of but never wins business, its entire investment is stranded. No carrier, even AT&T, can rationally build loop facilities merely on the hope that traffic will materialize on that point-to-point route. *See* AT&T at 127.

Ironically, the *Broadband 2001 Report*, on which the ILECs rely so heavily (but erroneously) elsewhere, actually confirms that extending fiber to individual buildings generally is *not* economically justified. That report expressly finds that "about 1,000,000 buildings are considered 'large' and 5% (or 50,000) can likely be connected economically through a fiber build." *Broadband 2001 Report* at 92. Further, the report concludes that "the *vast majority of business and revenues* in the [small and medium business] space *cannot economically be served* by [either fiber or wireless loops]." *Id.* at 94.[126]

In short, the ILECs' high-capacity fiber loops are characterized by enormous economies of scale and scope derived from serving its broader base of customers who were connected to their networks in the monopoly era. Only a few tens of thousands of buildings in the entire country could even theoretically provide enough demand to support a single CLEC-deployed fiber loop much less a wholesale market for such functionality. In the vast majority of cases, however, the record demonstrates that CLECs cannot reasonably expect to be able to aggregate sufficient customer demand to achieve economies of scale comparable to an ILEC, which in nearly all cases has ratepayer-subsidized loop plant already in place that has sufficient high-capacity fiber loop facilities or readily permits expansion or extension. *See* AT&T at 131-34.

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[126] The report continues: "Moreover, the industry-wide impact of facilities-based CLEC models may be constrained for some time because there are few such companies operating relative to the CLEC base and because the present state of the capital markets continues to limit the pursuit of these capital-intensive approaches." *Broadband 2001 Report* at 94.

2. CLECs Seeking to Deploy High-Capacity Loops Face additional Barriers to Entry, especially with Respect to Building Access.

The severe cost disparities that CLECs face due to scale and scope economies when deploying loops are only one side of the story. As AT&T explained (at 140-48), even in the small set of cases where deployment of fiber loops could potentially make economic sense, CLECs often face barriers to entry that are directly linked to the incumbents' historical monopolies and that often preclude deployment altogether. *See USTA*, 290 F.3d at 426-27.

Most prominently, building access continues to be a substantial barrier to entry for CLECs seeking to provide service over their own loops. Indeed, in the *Building Access* docket, the Commission has compiled an overwhelming record that building owners engage in a wide range of practices that discriminate against CLECs.[127] To this day, building owners often refuse to deal with CLECs because the incumbent has already delivered telecommunications access for the tenants. And even those landlords who will negotiate routinely engage in unnecessarily protracted negotiations with CLECs and seek to impose burdensome and discriminatory conditions on them. In particular, building owners typically seek to levy excessive charges on CLECs, including substantial revenue sharing provisions, monthly recurring fees well above commercial rates for common space used to warehouse telecommunications equipment, and one-time processing and administrative fees. Critically, building owners frequently force CLECs to bear higher costs than the incumbent or to comply with terms that do not apply to the incumbent – usually obligated to pay nothing – or else block access to the building entirely. Indeed, the Real Access Alliance, which represents about 10 percent of the nation's building owners,

[127] *See* Comments of AT&T Corp., WT Docket No. 99-217 (filed March 8, 2002) ("AT&T Building Access Comments"). AT&T's Comments in that docket are hereby incorporated by reference.